

**MANE 3351**

# **LECTURE 3**

# Classroom Management

## **Agenda**

- GitHub Classroom Setup
- GitHub Account Creation
- Raspberry Pi Programming
- Circuits
- Laboratory Session will meet today

# RESOURCES

# Handouts

- Lecture 3 Slides
- Lecture 3 Marked Slides

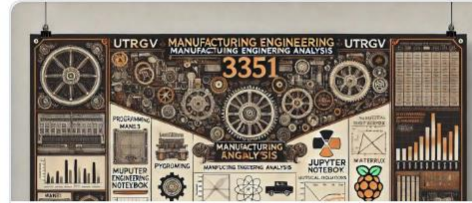
# Assignments

- Link personal GitHub account with GitHub Classroom

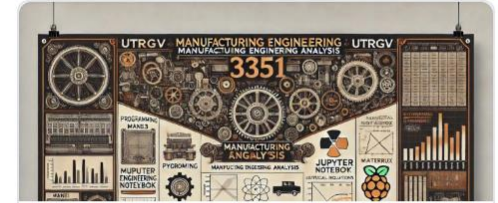
## Linking GitHub Account

Must be done once per semester

Click on the Lab Links Content Area



## Solutions



## Lab Links



## Homework 0

Click on the Homework 0 web link

MANE-3351-01-Fall 2025



Content

Activities ▾

Class Progress ▾

Tools ▾

Get Help ▾

Resources ▾



Listen



Visible

Add Existing

Create New

## Lab Links

- [Homework 0 - Link GitHub Account](#)



## GitHub Classroom

A GitHub Classroom screen will appear allowing you to join the classroom

Your GitHub classroom identifier is your UTRGV email account name

Select your email address from the list

Dr. Timmer created mane3351f24@gmail.com as his user account

## Join the classroom:

# MANE-3351-Fall-25

To join the GitHub Classroom for this course, please select yourself from the list below to associate your GitHub account with your school's identifier (i.e., your name, ID, or email).

Can't find your name? [Skip to the next step](#) →

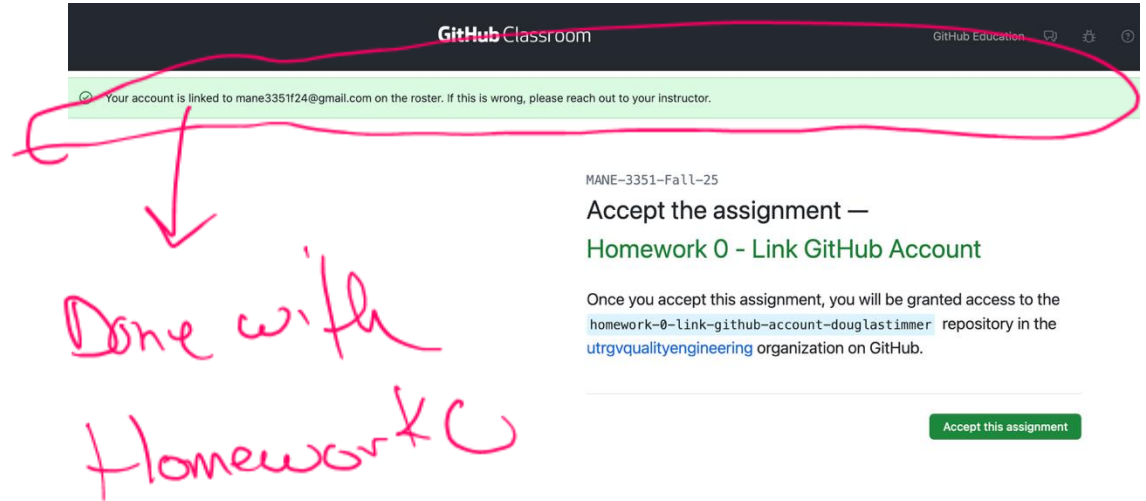
### Identifiers

	>
mane3351f24@gmail.com	>
	>

## Accept the Assignment

A screen will appear asking you to accept the assignment

Click on Accept this assignment



The screenshot shows the GitHub Classroom interface. At the top, the header reads 'GitHub Classroom' and 'GitHub Education'. A green notification bar at the top states: 'Your account is linked to mane3351f24@gmail.com on the roster. If this is wrong, please reach out to your instructor.' Below this, the assignment title is 'MANE-3351-Fall-25' followed by 'Accept the assignment — Homework 0 - Link GitHub Account'. The description says: 'Once you accept this assignment, you will be granted access to the homework-0-link-github-account-douglastimmer repository in the utrgvqualityengineering organization on GitHub.' At the bottom right, there is a green button labeled 'Accept this assignment'. Handwritten in pink, there is a large arrow pointing from the notification bar to the text 'Done with Homework KC'.

GitHub Classroom

GitHub Education

Your account is linked to mane3351f24@gmail.com on the roster. If this is wrong, please reach out to your instructor.

MANE-3351-Fall-25

Accept the assignment —

Homework 0 - Link GitHub Account

Once you accept this assignment, you will be granted access to the homework-0-link-github-account-douglastimmer repository in the utrgvqualityengineering organization on GitHub.

Accept this assignment

Done with Homework KC

### Acceptance Confirmation

After accepting the assignment, the following screen will appear

Eventually, a link will be provided to the repository created using GitHub Classroom

For Homework 0, this completes the assignment

In future assignments, you will have to clone the repository to your local computer and complete the assignment

The purpose of Homework 0 is to link your GitHub account to GitHub classroom and your UTRGV email address

## GitHub Classroom

GitHub Education



You accepted the assignment, **Homework 0 - Link GitHub Account** .  
We're configuring your repository now. This may take a few minutes to complete. Refresh this page to see updates.

 Your assignment is due by **Sep 5, 2024, 14:22 UTC**

UTRGV

## GitHub Authorization

Once the link is clicked, you will be asked to sign up for GitHub or verify your GitHub account if you have already logged into email on your computer (my case)

If you have not created a GitHub account, do so before proceeding. Notes are provided below.




It is recommended to use your UTRGV email but not required

Additional notes for creating GitHub account is provided after GitHub Classroom notes



SK18



GitHub Classroom by **GitHub** would like permission to:

-  Verify your GitHub identity (mane3351f24)
-  Know which resources you can access
-  Act on your behalf  
[? Learn more](#)

### Resources on your account

-  **Email addresses** (read)  
View your email addresses
-  **Plan** (read)  
View your subscription plan on GitHub

[Learn more about GitHub Classroom](#)

Cancel

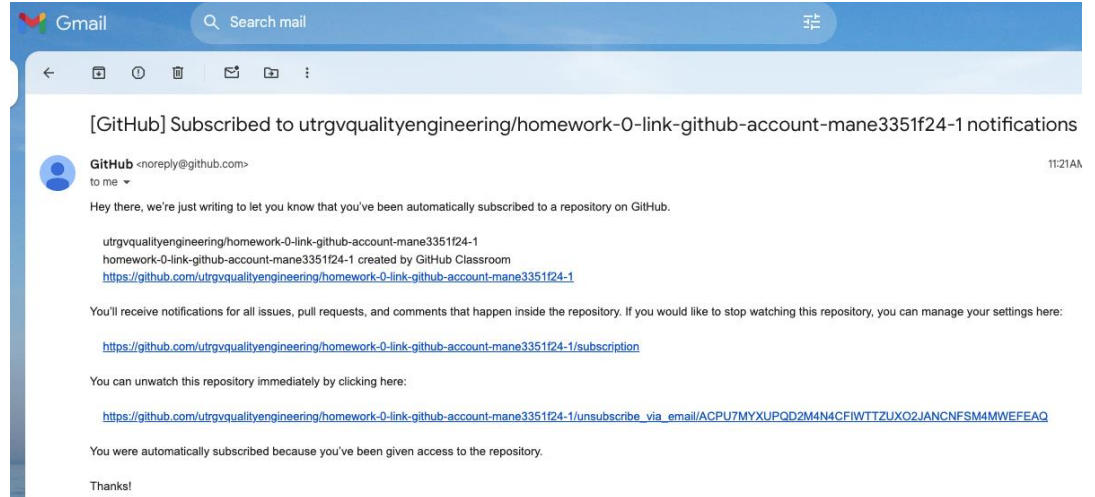
Authorize GitHub  
Classroom

Authorizing will redirect to  
<https://classroom.github.com>

## Email Confirmation

You will receive an email confirmation that contains a link to the repository to be downloaded

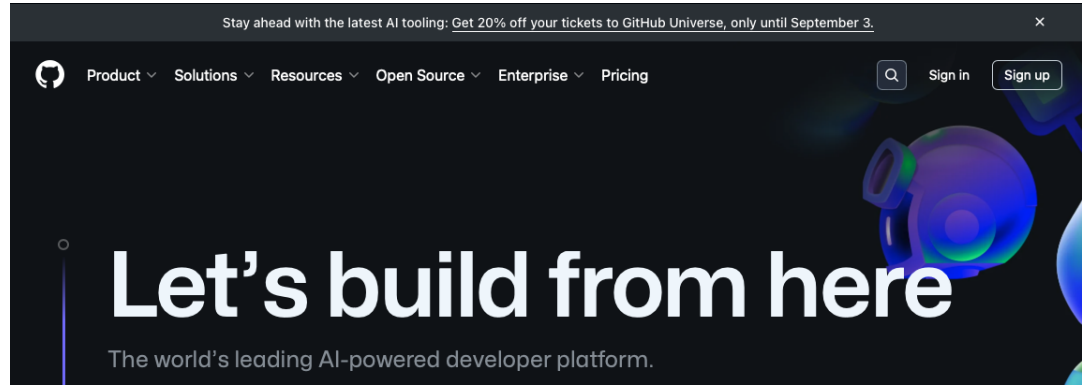
SKIP



## GitHub Account Creation

Click on Sign up to create a new account

5/18

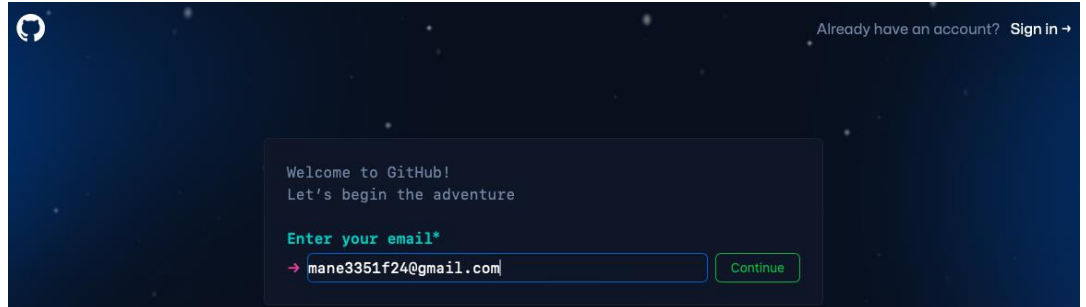


## Email Entry

Enter your email address (preferably UTRGV) and click continue

For this example, I am using a Gmail account I created for the course

SKIP

A screenshot of the GitHub welcome screen. The background is dark blue with a starry pattern. In the top left corner is the GitHub logo. In the top right corner, the text "Already have an account? Sign in →" is displayed. In the center, a dark gray box contains the text "Welcome to GitHub!" and "Let's begin the adventure". Below this, the prompt "Enter your email\*" is shown in green. Underneath the prompt is a text input field containing the email address "mane3351f24@gmail.com". To the right of the input field is a green button labeled "Continue".

Welcome to GitHub!  
Let's begin the adventure

Enter your email\*

→ mane3351f24@gmail.com

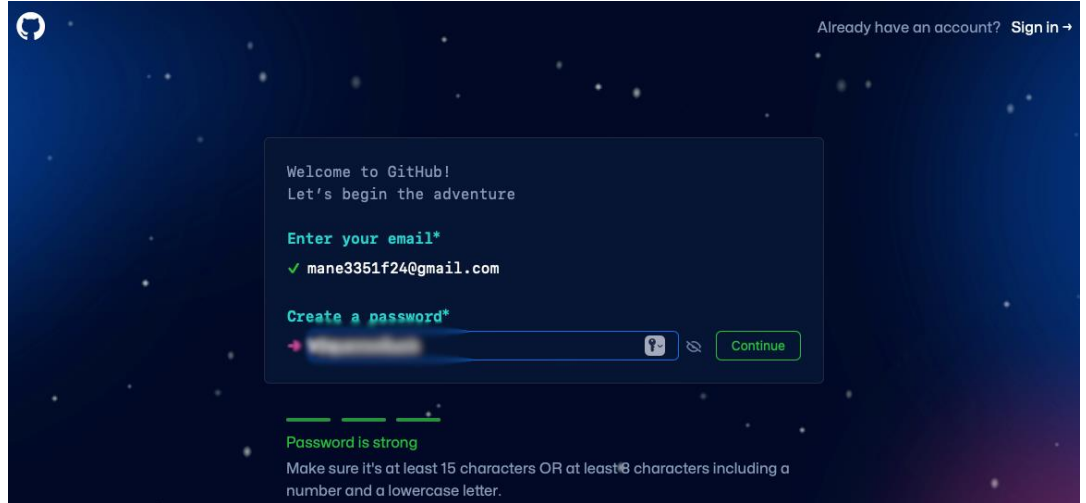
Continue

## GitHub Account Password

You will be asked to create a strong password

Click Continue when done

SKIP



The screenshot shows the GitHub account creation interface. At the top right, there is a link "Already have an account? Sign in →". The main content area has a dark blue background with a starry pattern. A central white box contains the following text: "Welcome to GitHub! Let's begin the adventure". Below this, there are two input fields. The first is labeled "Enter your email\*" and contains the text "✓ mane3351f24@gmail.com". The second is labeled "Create a password\*" and contains a blurred password. To the right of the password field is a "Continue" button. Below the input fields, there is a green progress bar with three segments, the first of which is filled. Below the progress bar, the text "Password is strong" is displayed in green. At the bottom, there is a note: "Make sure it's at least 15 characters OR at least 8 characters including a number and a lowercase letter."

Already have an account? [Sign in →](#)

Welcome to GitHub!  
Let's begin the adventure

Enter your email\*

✓ mane3351f24@gmail.com

Create a password\*

Continue

Password is strong

Make sure it's at least 15 characters OR at least 8 characters including a number and a lowercase letter.

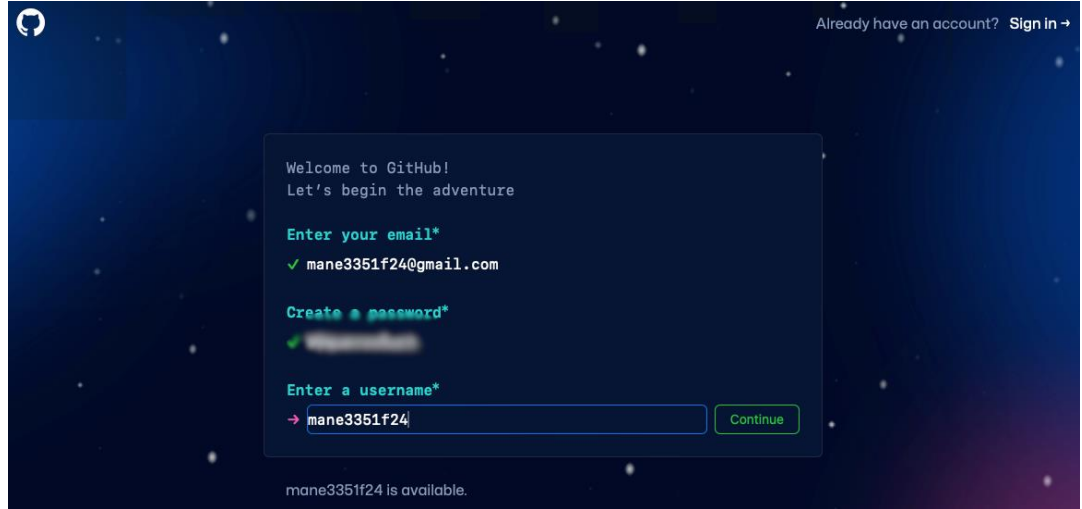


## GitHub Username

Create a username that is available

Your username will be incorporated into the repository name along with the assignment name

SKIP



The image shows the GitHub account creation interface. At the top left is the GitHub logo, and at the top right is the text "Already have an account? Sign in →". The main content area has a dark blue background with a starry pattern. A central white box contains the following text: "Welcome to GitHub! Let's begin the adventure". Below this, there are three input fields. The first is labeled "Enter your email\*" and contains the text "✓ mane3351f24@gmail.com". The second is labeled "Create a password\*" and contains a blurred password. The third is labeled "Enter a username\*" and contains the text "→ mane3351f24". To the right of the third input field is a green "Continue" button. At the bottom of the white box, the text "mane3351f24 is available." is displayed.

Welcome to GitHub!  
Let's begin the adventure

Enter your email\*  
✓ mane3351f24@gmail.com

Create a password\*  
✓ [blurred password]

Enter a username\*  
→ mane3351f24

Continue

mane3351f24 is available.

## GitHub Email Preferences

- you will be provided an opportunity to sign-up to receive occasional product updates and announcement.
- Signing up for email updates is optional
- No screen capture is provided of this step

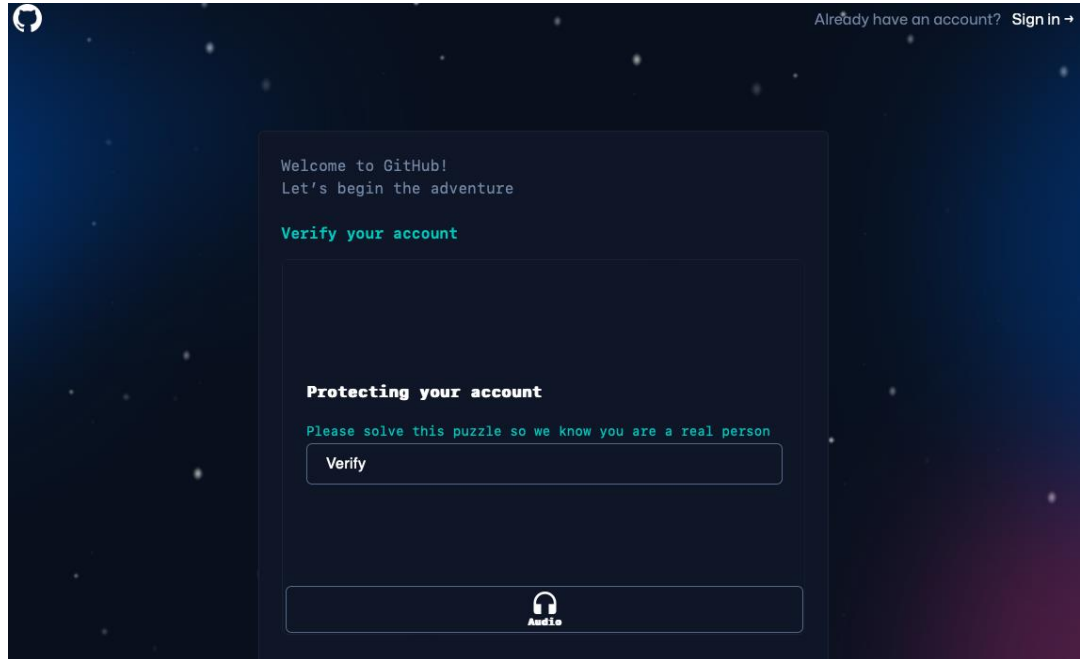
skip

## GitHub Verify Account

You will be prompted to verify your account by solving a puzzle

After verifying, a code will be sent to your email account that is needed

5/21/8



# What is a Circuit?

- A circuit is a loop through which current can flow
- A power source, such as a battery, provides the energy for the circuit to work
- Electrons flow from the negative side of the power source, through the circuit and back to the positive side of the power source
- Once the electrons return to the power source, the circuit is complete
- View example at web site

[Source](#)

# Components of a Circuit

Circuits consist of three parts:

- **Voltage Source:** this provides the electrons that flow through the circuit in order to power it. Common voltage sources are batteries and electrical connections such as outlets,
- **Load:** this consumes the power created by the voltage source. Loads are what make a circuit light up, make noise, run a program and more. In simple circuits, the load may be a single light bulb, but in more complex circuits, the load may be made up of a combination of resistors, capacitors, light bulbs, buzzers and more,
- **Conductive Path:** this is the route the current follows through the circuit. It must be made of conductive materials in order to allow electricity to flow. The path starts at the voltage source, travels through the load and returns to the voltage source. In order to create a closed circuit, this path must form a loop

An open circuit is one in which there is an interruption in the loop. The term “open circuit” is an oxymoron since the very definition of a circuit requires a closed loop.

[Source](#)

# Short Circuits

- When the conductive path of a circuit connects directly from one end of the voltage source to the other without first powering a load, the result is a short circuit
- Current flows everywhere it can, and if it can find a shorter path, it will take it. This is why conductive wires are coated in an insulator - to prevent accidental short-circuiting through wires touching.
- Short circuits can be very dangerous and cause wires to burn up, damage the power supply, drain the battery, start a fire and more. Most of the time your power supply will have some sort of safety mechanism built into it to limit the maximum current in the event of a short circuit, but not always. This is the reason all homes and buildings have circuit breakers, to prevent fires from starting in the event of a short circuit somewhere in the wiring. If you notice a part of your circuit suddenly becoming hot or a part suddenly burns out, immediately turn off the power and look for possible short circuits
- It is important to note that current does not limit itself to choosing just one path, it will take every available path it can find. Which means that even if a short circuit is present, a small amount of power may still be supplied to your load

[Source](#)

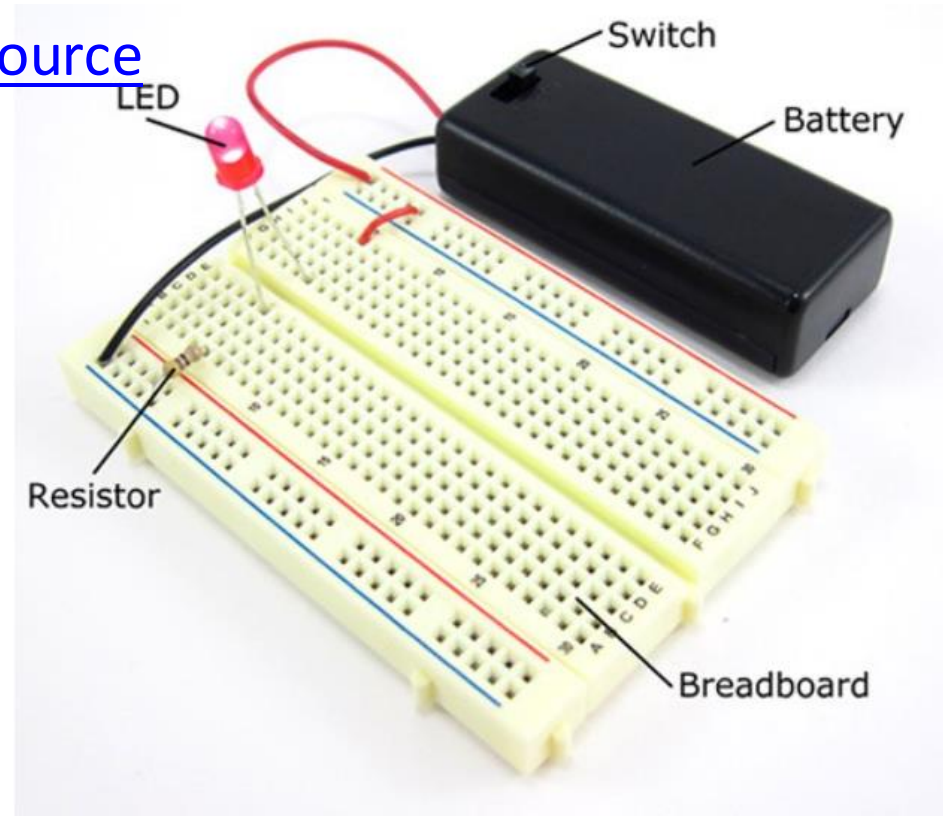
## Source

### Breadboard

A breadboard is a rectangular plastic board with a bunch of tiny holes in it

These holes let you easily insert electronic components to **prototype**

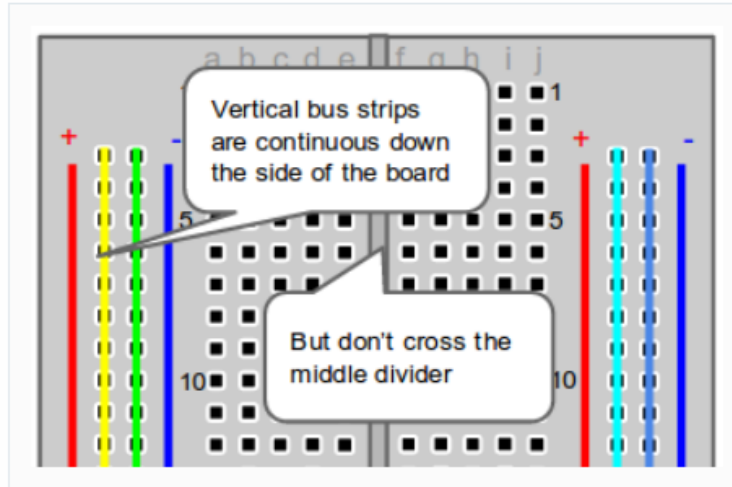
See illustration below



Breadboard

# Breadboard Columns

[Source](#)

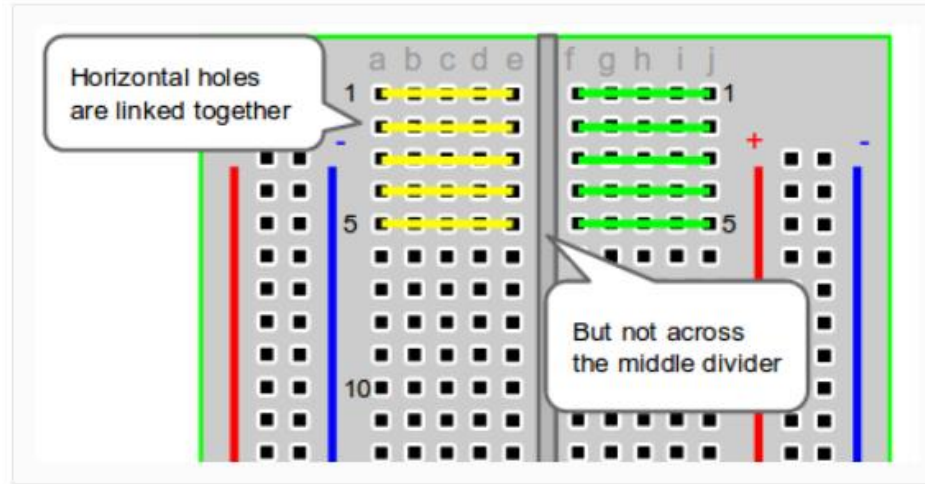


Vertical columns on the side of the breadboard are for power and ground.

Columns



# Breadboard Rows



You can see that the horizontal rows are connected on the inside.

Rows

Source

# Breadboard Demonstration

- Simple circuit: LED

# Ohm's Law

Defines the relationship between three quantities: voltage (V), current (I) and resistance (R)

$$V = IR$$

$$I = \frac{V}{R}$$

$$R = \frac{V}{I}$$

## Units

- Voltage measured in volts
- Resistance is measured in ohms
- Current is measured in amperage

$\Omega$  - ohm

Assume Voltage fixed  
220  $\Omega$  vs 10k  $\Omega$   
220  $\Omega$  I 10k  
larger smaller

# Resistor Color Codes

## Source

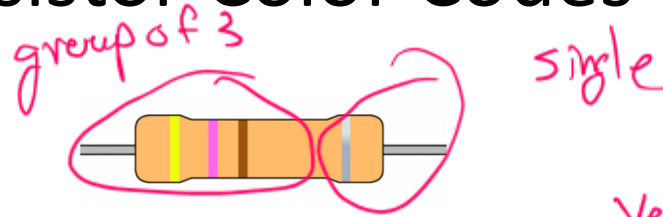


Figure 1: 470 Ohms 10% Resistor

Color	Color	1st Band	2nd Band	3rd Band Multiplier	4th Band Tolerance
Black		0	0	x1Ω	
Brown		1	1	x10Ω	±1%
Red		2	2	x100Ω	±2%
Orange		3	3	x1kΩ	
Yellow		4	4	x10kΩ	
Green		5	5	x100kΩ	±0.5%
Blue		6	6	x1MΩ	±0.25%
Violet		7	7	x10MΩ	±0.10%
Grey		8	8	x100MΩ	±0.05%
White		9	9	x1GΩ	
Gold				x0.1Ω	±5%
Silver				x0.01Ω	±10%

Figure 2: 4 Band Resistor Color Code Chart

Yellow  
violet  
Brown

4  
7  
10Ω

silver

±10%

## Resistor Color Codes

47 x 10Ω or 470Ω

R 2  
R 2  
Black  
Brown 10Ω  
22 x 10Ω = 220Ω

Brown 1  
Black 0  
Orange 1kΩ

10 x 1kΩ = 10kΩ  
= 10,000Ω

# Breadboard Demonstration 2

- What happens when we change resistors in the circuit?
- Does your observation agree with Ohm's Law?

# Raspberry Pi GPIO Pins

- GPIO pins are digital: on or off
- GPIO pins can receive (input) current or send (output) current
- Operating voltage of the GPIO pins is 3.3 V
- Used for low current applications, not powering motor
- GPIO pins are programmable using Python, JavaScript, non-RED, etc.
- Other types of pins will not be considered

[Source](#)

# Raspberry Pi Pin Assignments

## GPIO REFERENCE

Use the guide below to easily identify each of the 40-pins of the GPIO port.



GPIO2

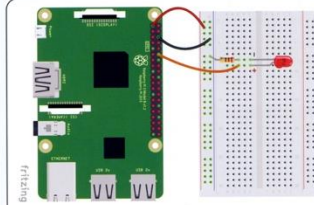


# Blinking an LED Demonstration

## BLINKING AN LED

To blink an LED, use three male-to-female jumper wires and a 220 Ohm resistor (red, red, brown) to connect the LED to the GPIO port as shown below.

Note that it is important for the LED to be connected with correct polarity or it will not light up and you may damage the LED. The longer leg of an LED is called the Anode (+) and the shorter leg is called the Cathode (-). In this example, the shorter leg (Cathode) is to be connected to the resistor.



```
import RPi.GPIO as GPIO
import time

GPIO.setwarnings(False)
GPIO.setmode(GPIO.BCM)
GPIO.setup(18, GPIO.OUT)

while True:
    GPIO.output(18, True)
    time.sleep(1)
    GPIO.output(18, False)
    time.sleep(1)
```

Raspberry PI  
Right Row  
to down

Blink

## Blinking an LED Code

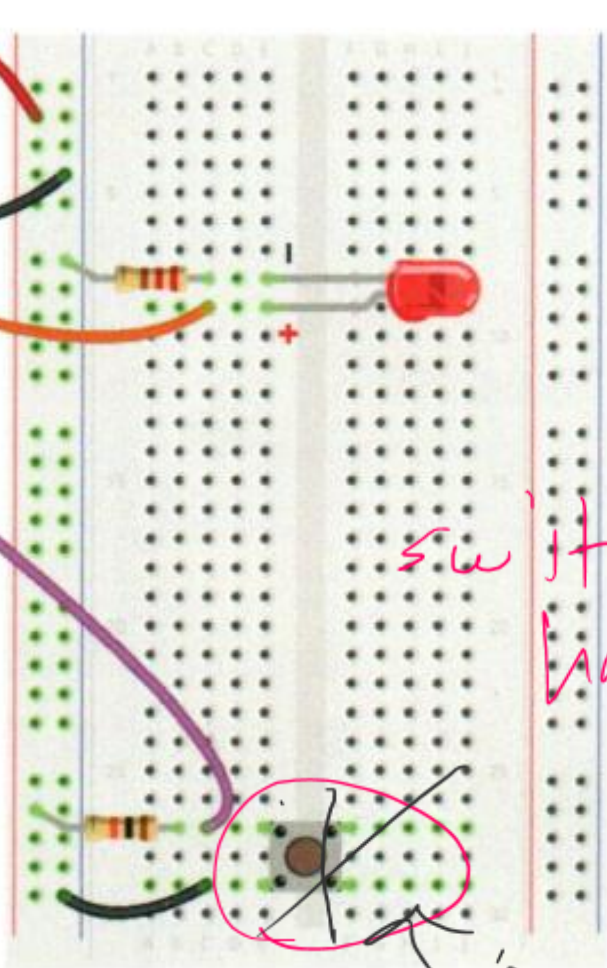
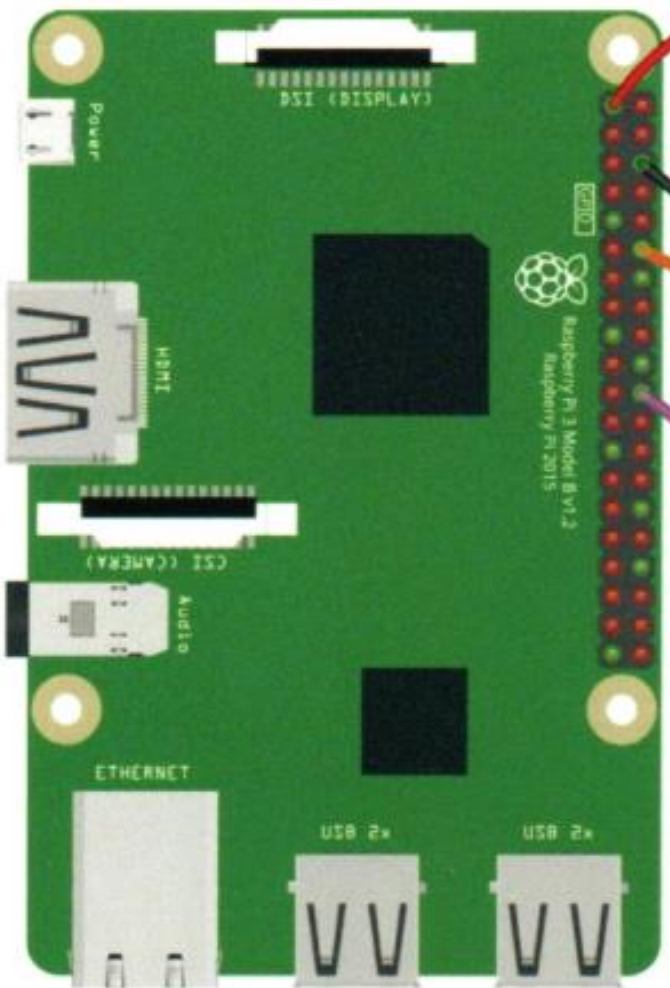
```
import RPi.GPIO as GPIO
import time
```

```
GPIO.setwarnings(False)
GPIO.setmode(GPIO.BCM)
GPIO.setup(18, GPIO.OUT)
```

```
while True:
```

```
    GPIO.output(18, True)
    time.sleep(1)
    GPIO.output(18, False)
    time.sleep(1)
```

→ indented block



switch  
was  
4  
pins

ignore rest

# Raspberry Pi Demonstration

1. Circuit construction
2. Connecting circuit to Raspberry Pi
3. Python programming
4. Blinking an LED demonstration
5. Can anyone identify the unused connector in the circuit?

Raspberry Pi demonstrations will be recorded using a HD Video Capture box typically used for recording computer games.